

Appendix J

Data Supporting the Analysis of Benefits and Costs

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Table J-1. Compression of Course Length

| <p>Compression of course length due to conversion to a technology-supported learning delivery method (compression expressed as percentage of previous classroom delivery time). Example: 75% compression means previous 8-hour course when converted takes 6 hours; 25% compression means previous 8-hour course converted to 2 hours.</p> | | | |
|---|-----------------|---|---|
| Item | Delivery Method | Compression Data | Source |
| 1 | ITV | FAA reported 75% compression | Federal Aviation Administration (FAA), Operations Research Service, <i>Cost-Benefit Analysis of Implementing Distance Learning (MNS #124)</i> , section 2.2, April 1994 |
| 2 | ITV | FAA cited industry studies showing as much as a 50% compression | Federal Aviation Administration, <i>Course Developer's Guide for Video Teletraining</i> as cited in the Social Security Administration publication, <i>Interactive Distance Learning: Recommendations for Training Delivery</i> , draft, April 1995 |
| 3 | ITV | Hewlett Packard reported 50% reduction in classroom hours | Letter from Dave Lewis, Hewlett Packard Video & Broadcast Services, to Patrick S. Portway, Executive Director, United States Distance Learning Association, July 1996. |
| 4 | ITV | Training academy reported 50% to 75% compression | Data provided by the Department of Energy, Safeguards and Security Central Training Academy, Albuquerque, New Mexico |

Table J-1. Compression of Course Length

| Item | Delivery Method | Compression Data | Source |
|------|-----------------|--|---|
| 5 | various | Author cited three studies from 1990-1994 indicating 30-40% reduction in classroom instruction time | Larry D. Moulds, Ph.D., <i>Using Distance Learning in the Training of Adult Learners</i> , ED Journal, Volume 10#6, United States Distance Learning Association, June 1996 |
| 6 | CBT | Organizations interviewed cited the following compression rates: Arthur Andersen and Company: 57% Apple Computer: 13% DOE/Westinghouse Hanford: 15% | Based on an informal telephone survey conducted by the Center for Performance Improvement, Idaho National Engineering Laboratory, Lockheed Martin Idaho Technologies, 1995 |
| 7 | CBT | Results of 6 studies indicate overall average 35% to 40% reduction in course length: Fletcher (40 samples): 31% average Adams (6 controlled samples): 38%-70% Union Pacific (2 courses): 35%-50% Bradley (30 samples): 50% Kulik (>100 samples): 30% Hall (>100 samples): 20%-80% with 40%-60% most common | Rex J. Allen, <i>Step Right Up! Real Results for Real People</i> , Computer-based, Multimedia Training Can Make a Big Difference, If It Is Done Right, Allen Communications, 1997. Internet publication at http://www.allencom.com |

Table J-2. Hours Expended and Cost for Conversion from Existing Training

| <p>Cost for conversion from existing training is based on conversion to one hour of delivered training. Hour estimates are based on the hours expended on the development of one hour of delivered training.</p> | | | |
|--|-----------------|--|---|
| Item | Delivery Method | Cost Data | Source |
| 1 | ITV | Average cost of \$14,900 per delivered hour of training | Data provided by the Department of Energy, Safeguards and Security Central Training Academy, Albuquerque, New Mexico |
| 2 | ITV | Average cost of less than \$3,000 per delivered hour of training | Estimate provided by Ed Kovac of Vertex Solutions, Inc. based on experience with the Federal Aviation Administration. |
| 3 | CBT | Cost estimate of \$25,000 per delivered hour of training based on 200-250 hours expended to develop one hour of delivered training | Rex J. Allen, <i>Step Right Up! Real Results for Real People</i> , Computer-based, Multimedia Training Can Make a Big Difference, If It Is Done Right, Allen Communications, 1997. Internet publication at http://www.allencom.com |
| 4 | CBT | <p>Range of hours from less than 100 to more than 800 depending on course complexity</p> <p>Type 0 - Hypertext: less than 100 hours Type I - Interactive Hypermedia: 100-300 hours Type II - Interactive Multimedia: 200-500 hours Type III - Simulation: 400-800 hours</p> | V. Eugenio and E Habalow, "Is All Multimedia Created Equal? Differentiating Between Four Types of Multimedia Products," <i>Journal of Instruction Delivery Systems</i> , Winter 1994. |

Table J-2. Hours Expended and Cost for Conversion from Existing Training

| Item | Delivery Method | Cost Data | Source |
|------|-----------------|---|--|
| 5 | CBT | Organizations interviewed cited the following estimates: Arthur Andersen and Company: \$70,000-150,000 Apple Computer: \$6,000-48,000 DOE/Westinghouse Hanford: \$7,500 Nuclear Regulatory Commission: \$31,000 DOE/Savannah River: \$15,000 without video \$80,000-90,000 with video | Based on an informal telephone survey conducted by the Center for Performance Improvement, Idaho National Engineering Laboratory, Lockheed Martin Idaho Technologies, 1995 |

Table J-3. Cost for Training Related Travel

| Item | Cost Data | Source |
|------|---|---|
| 1 | \$1000 per trip (\$500 airfare, \$100 per day per diem, 5 days) | Rex J. Allen, <i>Step Right Up! Real Results for Real People</i> , Computer-based, Multimedia Training Can Make a Big Difference, If It Is Done Right, Allen Communications, 1997. Internet publication at http://www.allencom.com |
| 2 | \$1,500 per trip | Data provided by the Department of Energy, Safeguards and Security Central Training Academy, Albuquerque, New Mexico |